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With the Author's Compliments



CHOLERA

17

IN

EGYPT.

BY

F. M. SANDWITH, M.D.,

PHYSICIAN TO KASR EL AINI HOSPITAL, CAIRO.



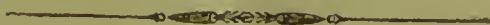
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Cholera in Egypt.

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From a date some two hundred years before the Christian era and until 1844 A.D., Egypt was well known as one of the favourite lurking places of the Black Death or Plague, and before she had fully shaken off the liability to this pestilence, she found herself attacked by another, almost as terrible in its fatality, and in its general distribution.

In 1817 or a few years earlier, cholera in an epidemic form first spread over India, and seems not to have travelled westward to Arabia, Persia, and Syria until 1821-22.*

1831. In November 1828, it was again in Arabia, and in the spring of 1831, cholera spread a third time to Mesopotamia and Arabia, and from those countries it was carried by bands of pilgrims to Syria and Palestine, and also by way of Suez to Egypt. It appeared in Cairo in July, spread up the Nile to Luxor, and broke out in August in Alexandria, causing the European consuls to put such pressure on the Viceroy that quarantine stations and laws were at once agreed upon. This first epidemic in Cairo lasted till the end of October during the summer months; the total number of deaths from all causes in Cairo reached 55,000 (36,000 from cholera) the mortality on one day being reported as 2,500.† Mussulman resignation was of no avail against this evidence of Heaven's displeasure, and those who had philosophically endured the Plague fled ignominiously towards the sea, or up the Nile to Nubia.‡

1834. Dr. Clot Bey, the head of the Sanitary Department of Egypt, writes of a cholera epidemic in Cairo in 1834 and of yet another in 1840,§ but says that they were much milder than that of 1831. There is no official record of these two outbreaks, but Clot Bey says that 400,000 in the provinces and 30,000 in Cairo died of the Plague during six months of 1834. It may be noticed here that steam communication between India and Egypt began in March 1830, the "Hugh Lindsay" then taking 32 days to make Suez from Bombay.

1837. Egypt was visited a third time by cholera in September 1837,|| a few months before the scourge was to leave Europe, Africa,

* "As the epidemic was threatening to enter Egypt through Syria, the Pasha applied to the Supreme Board of Health of Paris for directions by which the fatal junction of the Indian cholera with the plague might be prevented in the Valley of the Nile."—*History of Asiatic Cholera by Macnamara*. 1876, page 64.

† "Three-fourths of the pilgrims are calculated to have perished during the three days they were densely crowded together at Mecca, and of the fugitives 10,000 fell victims on their journey. Egypt lost on the whole 150,000."—*Dr. Graves' Clinical Lectures*. 1848. Vol. i., page 397.

‡ Dr. Clot Bey. Dr. Chamas. T. Colucci Bey.

§ *Les épidémies de choléra du Caire de 1834, 1840, et 1848*. M. Clot Bey. Paris.

|| Hirsch and others. Dr. Néroutsos Bey.

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and America completely free for a period of at least 10 years. Upon this occasion the outbreak was apparently the continuation of a progress through Tripoli and Tunis, and spreading to Abyssinia, Zanzibar, and the Soudan. The epidemic was a mild one, and it is to be noted that it did not occur at a time of year when pilgrims were certainly in movement.

1848. In May 1846, cholera showed itself at Aden, Mocha, and Jeddah, thence spread into Syria, and appeared among the pilgrims at Mecca in November. In January 1847, "2,000-3,000 of them are reported to have perished by it in the one night of their pilgrimage from Mecca to Mount Arafat."* In the following autumn and spring cholera was at Constantinople, and seems to have spread from Turkey over Syria and Egypt, and thence travelled as far as Morocco. (Hirsch). But as it had burst out again at Mecca† and Medina in April 1848, it may very easily have entered Egypt with some returning pilgrims. The accounts‡ that I have read say that it broke out in Egypt on June 24 at the Tantah fair, which was attended by many pilgrims, swelling the crowd to 195,000. Of these, 3,000 died at Tantah, and this outbreak is still named after the patron saint of that fair; 300 died daily in Cairo (July 15 to end of August), almost as many in Alexandria, and the whole number of victims was about 20,000.

1849. Hirsch, without giving details, states that cholera was again présent in Egypt in 1849.

1850. Towards the end of June 1850, cholera again appeared in Cairo on the arrival of some pilgrims from Mecca, and it lasted until the beginning of August, the cholera deaths reaching 212 per day. At that time there was no railway between Suez and Cairo, and the pilgrims used to encamp in great numbers near Cairo. As a consequence of this outbreak, the Sanitary Department of Egypt obtained fresh powers for enforcing quarantine, hygiene, and medical reforms.

1855. On May 26th, 1855, cholera again broke out in Cairo on the return of some pilgrims from Mecca, the earliest deaths taking place at Boulak among the pilgrims. The maximum number of deaths¶ from cholera in Cairo was 350 on June 15th, and the scourge came to an end there on July 9th, not, however, before it had spread to Nubia and through Northern Africa to Morocco. The total cholera mortality this year was 26,145. It should be remembered that the pilgrimage to Mecca and the return journey are fixed by the varying Mussulman months, which accounts for the apparent discrepancy in dates of the various epidemics.

* Report of Board of Health on Cholera. London, 1850.

† Cholera Conference of Constantinople. Calcutta, 1868, page 764.

‡ Considérations sur le Choléra par Dr. Willemin. Strasbourg, 1866, page 13.

M. Colucci Bey.

¶ I am indebted for some of my historical notes to a friend's paper which has been printed, but not yet published.

¶ Cholera mortality in Cairo, 4063. M. Colucci Bey.

There are records of five severe cholera epidemics in Arabia between the years 1854 and 1862, and the west coast seems to have been always the most severely visited, while Syria was overrun by the disease in the years 1859-61.

1865. The fourth pandemic of cholera in the world's history began in 1863 and came to an end in 1875, embracing as is usual a period of more than 10 years. It was distinguished from all previous cholera pandemics by the speed with which it travelled from Asia to Europe, taking only a few days to reach Europe by sea from the coast of Arabia and only a few weeks to overrun the south of Europe.* About the beginning of 1865 the disease was brought on board ship from the Bombay coast to South Arabia and to Somali Land. In April or in the first days of May, during the religious fêtes, it broke out in Mecca among the 100,000 faithful, causing a panic and general flight and dispersion of the poison along the tracks of the homeward bound pilgrims. At Suez a vessel arrived on May 19th from Jeddah with choleraic pilgrims belonging to Egypt and the rest of North Africa. There were 1,500 on board, and the captain and his wife were attacked with cholera on May 21st at Suez. The pilgrims underwent medical inspection at Suez, and were conveyed to Alexandria in special quarantine trains,† and were there encamped in the desert by the sea shore. Notwithstanding precautions, cholera broke out among the railway employés at Alexandria on June 2nd, and by June 17th had spread to Aboukir, Tantah and Cairo. A week later it appeared at Rosetta, Damietta, and Mansourah, towns with which there was then no railway communication, and travelled up the Nile to Minieh, and to the Soudan, Suakim, and Kassala. Dr. Néroutos gives 62,000 as the number of deaths from cholera in Egypt, besides all those not officially registered, (Colucci Bey gives 80,000). The deaths at Cairo from June 17th to the end of September, when the epidemic disappeared were 12,429 from all causes, the maximum cholera mortality having been 468 on July 5th.‡

In July cholera seems to have been carried directly from Alexandria by ships to Constantinople, Italy, and Spain, no less than 35,000 people having fled from Egypt during 30 days. In Arabia itself the pestilence had spread into the Nejd, and was prevalent there again the following year, while Syria was also affected by epidemic cholera during 1865-6. As a consequence of the epidemic in Egypt a conference was held at Constantinople in February 1866, and the quarantine stations of to-day were agreed upon. Among other safeguards, sanitary officers were sent to live at Jeddah and at Yambo, and an Egyptian doctor was ordered in

* Hirsch. *Geographical and Historical Pathology*, vol. i., p. 413.

† Colucci Bey, 1866; Dr. V. Dumesthe, Alexandria, 1865; R. de Beauregard, Marseilles, 1878; Dr. de Bressy, Alexandria, 1865.

‡ The 1865 epidemic in Cairo was infinitely worse than that of 1883. The common street carts were piled with five or six half-naked bodies, dying and dead together, en route to hospital and grave-yard. The English employés of the railway suffered terribly, some 95 dying out of 102 attacked, while the survivors were half maddened by grief, drink and fear.

future to accompany the caravan of pilgrims to Mecca and Medina. The Egyptian Board of Health were quite unequal to the task of grappling with the threatened epidemic of 1865, for though they sent in April two native doctors to the Hedjaz to report upon the excessive mortality of this year's pilgrimage, and though these reported to them on May 10th terrible cholera at Mecca, they allowed more than 12,000 returning pilgrims to land at Suez,* and though cholera patients were seen at Suez on May 21st, and at Alexandria on June 2nd, the disease was not officially declared until June 12th. Here is well exemplified the futility of trusting to quarantine alone as protection from cholera, for upon this occasion Alexandria had been infected before the disease was declared at Suez, and cholera had passed on to France before it was officially known to be in Alexandria, while Valenceia was infected from Marseilles before Marseilles confessed itself attacked. It appears that the sickness was most fatal and prevalent among the pilgrims the third day of the rites during the assemblage on Mount Arafat, on which day the deaths in Mecca were estimated at 200. The whole number of pilgrims this year was 90,000 to 100,000, and the accounts of the cholera mortality among them varies from 10,000 to 30,000. Deaths occurred among the soldiers, the inhabitants of the Holy Places, and the pilgrims. "The streets of Mecca, its mosques, the 12 miles of road lying between the city and Mount Arafat, the Valley of Meena, and the plain of Arafat, were encumbered with the dead."

1866. Dr. Néroutsos Bey, the Vice-President of the Sanitary Board, tells us that his office was summarily suppressed in consequence of his excess of zeal in discovering a reappearance of cholera in Egypt in 1866. There can be no doubt that the disease existed in that year, for in March and April there were sporadic cases,† and a fatal form of diarrhoea among the Suez Canal workmen, while in May and June dropping cases occurred in Suez and Alexandria, and again in August 23 deaths from "cholerine" were reported from a village near Zagazig of 300 inhabitants. Alexandria suffered for two months from September 12th from a considerable cholera outbreak, the cases numbering at one time 60 daily. No complete report of this little epidemic has ever been made.‡ The official number of pilgrims who returned from Mecca to Suez between May 7th and July 22nd was 12,887. Cholera was again observed in Mecca 20 days after the end of the religious sacrifices, and five days after the departure of the great caravan for Egypt, and was carried by the pilgrims to Medina, and thence to Yembo, Damascus, and other places.

In 1871, after a two years' remission for those countries that had suffered severely from the disease, cholera on June 19th again appeared in northern Arabia. It seems to have travelled from Persia, and quickly spread to Medina (1,000 deaths), Mecca, and Jeddah.

* The total number of pilgrims landed at Suez returning from Mecca was 18,490. Mr. Netten Radcliffe's Report to Privy Council on Cholera of 1865-74. London 1875.

† Procès Verbaux de l'Intendance Sanitaire d'Égypte. Paris, 1866, p. 114.

‡ Netten Radcliffe, p. 106.

News of this reappearance reached the Sanitary Board of Egypt on August 30th, by a report dated Medina July 25th, and formed the basis of much discussion on September 4th and during the following weeks.* The Turkish official figures for this year's pilgrimage reached 50,000, of whom some 16,000 either started from Egypt, or passed through Egyptian territory on their way to the Holy Places. But the Egyptian official document from which I am quoting believes that the total number of pilgrims at Mecca reached from 80,000 to 100,000 during the feast days which fell on February 19-23 in 1872. Needless to say, the slumbering pest which was only waiting for its victims to assemble, broke out once more at Mecca in February and spread without delay to Yembo, and Hodeida, but Jeddah and the sea route appear to have been quite free from the disease. The Grand Caravan of Cairo, numbering 1,130 souls, reported 24 deaths from cholera between Mecca and Medina, and after leaving Medina five deaths from ordinary sickness. More than 9,800 pilgrims were conveyed homewards through the Suez Canal, and some dismay was caused in the month of April by finding six dead bodies in the canal, presumably due to non-choleraic causes, but summarily disposed of by the captains of steamers who feared to be placed in quarantine at Port Said. The pilgrims returning to Egypt in 1872 numbered 2,043 by sea and 1821 by land, their dates of arrival extending from March 23rd to May 22nd.

When news reached Egypt of the 4,000 deaths which took place at Medina, and on the road between Mecca and Medina, a quarantine detention was ordered of 20 days at El Wedj, and another 10 days in case of necessity at Moscs' Wells. The then Quarantine Board of Alexandria, consisting of 17 Europeans and one native member, not unnaturally took credit to themselves for preventing an introduction of cholera into Egypt by these measures.

Mecca, and the rest of Arabia, were believed to be clear of the disease in April, but in June it broke out near Suakim, and spread to Tokar, Kassala, Berber, and Dongola, accounting for 1,970 official deaths between June and November.

Dr. Demech† says that there was an outbreak of cholera in the Soudan in September 1872, travelling down the Nile from Dongola, and reaching Korosko in the first days of November, Egypt proper escaping invasion.

During the summers and autumns of 1871-72 cholera was expending its chief intensity in European Russia, where 633,318 victims were registered, and a quarter of a million people died. In 1873 the epidemic was very destructive in Austro-Hungary and Germany, and was directly followed in 1874 by the International Sanitary Conference at Vienna, which decided, among other things, against the supposed efficacy of land quarantine. Europe remained free of cholera from 1874 to 1883, but in 1875 an unexplained outbreak occurred in Syria, ranging widely over the interior and along the coast towns, and lasting

* Mésures prises en Egypte à raison du choléra. Alexandrie, 1872.

† Blue Book, No. 38 (1883), p. 57.

from March 22 at Hamah to the beginning of January, 1876. Dr. Mahé* calculates that Damascus lost 4,000 victims, the province of Aleppo more than 7,000, and the smaller towns in proportion.

The pilgrimage of 1877-78 proved again to be a great danger for Egypt, for cholera broke out at Mecca (2,500 deaths) on December 23, immediately after the sacred rites (Dec. 13-16) which had been attended by more than 100,000 pilgrims.† It is thought to have been brought to Mecca by pilgrims from Penang, Singapore, and other places in the far East. The first batch of returning pilgrims reached the Egyptian quarantine station of El Tor on December 30th, and at once furnished five cases of certain cholera, and 16 cases of "suspicious diarrhoea."

During January and February 1878 the deaths at El Tor numbered 127, and were returned as cholera, 6; diarrhoea, 52; ordinary diseases, 69. Altogether 12,210 pilgrims arrived at Tor, of whom 5,184 were Egyptians, who underwent a further quarantine delay at Moses' Wells. No case of cholera occurred in Egypt. It was pointed out in the official report that many steamers carried a greater number of pilgrims than they were entitled to, one conveying 836 instead of a legitimate 626, and also that some 10,000 pilgrims embarked at Yambo to return home without any medical or sanitary supervision, and in conditions of great overcrowding.

In 1881 cholera was at Aden (151 deaths) in August and September, and on the south coast of Arabia in November. Its arrival at Mecca was officially known at Constantinople on September 27th, by a telegram from Jeddah dated September 21st, but the first cases were seen at Mecca at the end of August.‡ The disease rapidly spread to Medina and along the Damascus and Bagdad routes, but did not explode with violence at Mecca till the fête days, November 1-5, when there were 300 deaths per day (Dr. Chaffey Bey). This epidemic caused 6,000 to 7,000 deaths in the Hedjaz before it died out at the end of the year. The pilgrims returning to Egypt and the Mediterranean had several cases of cholera among them while being detained at El Wedj. (Dr. Ardouin's Report.) They eventually reached Egypt on and after January 22, 1882.

In 1882, about October 21st, at the commencement of the Bairam fête, cholera again broke out at Mecca, and it is noteworthy that Constantinople heard of it by telegram on November 2nd. Cases followed in the Minah Valley, at Medina and some neighbouring villages, at Jeddah, and along the caravan routes. Officially there were more than 600 cholera deaths altogether, and Dr. Mahé believes that this number

* *Mémoire sur la marche du choléra, etc. depuis 1875-1884.* Constantinople. Dec. 1884, p. 3.

† *Exposé des mesures prises en Egypte contre l'épidémie cholérique du Hedjaz de 1877-8.* Alexandria, 1878, p. 7. The Damascus caravan which left Mecca for Medina on December 19th was attacked *en route*, and lost 169 out of less than 5,000.

‡ Dr. Mahé, p. 15. Cholera in Egitto, Dr. de Castro; Milano, 1884, p. 54. *Le Choléra*, par Dr. Fournol; Paris, 1883, p. 112.

should be doubled. But the doctors at Mceea looked on it as a light epidemic, and said that about three-quarters of the attacked recovered. The Egyptian pilgrims underwent from 10 to 15 days' quarantine at El Wedj, and arrived in good health in December 1882.

Is it possible that any of them, returning then or later from the Holy places can have brought cholera germs with them in their bodies or their clothing? To suppose that they can have been in any way responsible for the explosion at Damietta in June 1883, we must argue that the poison laid dormant for two or three months, then caused epidemic diarrhœa, and finally when the drinking supply was at its worst possible, when the subsoil water was at its lowest, and when a large concourse of men had gathered at Damietta, was then recognised for the first time as cholera in a town which richly deserved its fate.

But this involves too many theories for me to wish to commit myself to. Only it has sometimes surprised me that some of those who so fiercely contended in 1883 for the theory of importation, should not have at least considered this question.

Possibly most of them were unaware that there had been cholera in the Hedjaz at the end of 1882, as even now it is certainly not generally known, but the idea would seem quite as plausible as that of direct importation from India.

A glance at Table I. will show that cholera in Egypt has nearly always been preceded by the disease at Mecca, though the evidence of direct transmission is not always present.

I may mention here that cholera again appeared at Mecca in 1883 on October 14th, the second day of the fête, and caused 637 official deaths at Medina and elsewhere during the ensuing three weeks. It is important to notice that the news of this modified epidemic did not reach Egypt or Turkey till October 30.

TABLE I.

Year.	Cholera at Mecca.	Earliest Return of Pilgrims to Suez.	Duration of Cholera in Egypt.
1831	Spring - - -	July - - -	July to October (end).
1834	? - - -	? June - - -	?
1837	Summer, and autumn 1835.	? May - - -	September.
1840	? - - -	? April - - -	?
1848	1846-7-8 - - -	? February - - -	June 24—October 20.
1849	1848 - - -	? January - - -	?
1850	? - - -	? January - - -	June (end)—October 1.
1855	1854-5 - - -	October 19 - - -	May 26—September 22.
1865	April or May - - -	May 19 - - -	June 2—September (end).
1866	May - - -	May 7 - - -	March—November 12.
1883	1881-2 - - -	December 4, 1882 -	June 22—December 26.

1883. During the three-score years which have now elapsed since the first time when cholera attacked Egypt, it may be noticed that there has been a marked tendency to its less frequent appearance, for in the

years 1831-51 it was present in Egypt seven times, while in the second score of years it occurred three times, and in the last period, from 1871-91, it has only once been known. I have said that in 1865 cholera reached Europe directly from Egypt, and in 1883 she had the unenviable notoriety of passing it on a second time to the northern coast of the Mediterranean.

On June 22nd cholera was discovered at Damietta, and a sanitary cordon was put round the town, though many inhabitants had in the meantime fled to Mansourah, Port Said, and other places. The epidemic broke out at Port Said on June 25th, but there were only eight deaths there, and no sick among the small garrison of 100 English soldiers. On June 26th the first cholera death took place at Mansourah in the person of a sanitary attendant, who had accompanied an investigating commission to Damietta, and had assisted at an autopsy there. Four more deaths occurred the same day among refugees from Damietta, and on the afternoon of June 28th, a cordon was placed round the town. By this time there were 101 deaths a day, and the epidemic continued here altogether seven weeks, accounting for 1,927 deaths. The Mansourah cordon was soon made to include Talka, on the opposite bank of the Nile, and its history is one of unmitigated stupidity and irritation. Its sole justification, if any, should have been to confine the cholera and its prey to the infected town, but numerous instances were given of the escape of townspeople to neighbouring villages, and the cordon seems to have been regarded by the authorities as means for preventing doctors, chemists, drugs, and even food to enter the plague-stricken spot. Food rose to starvation prices, and a committee of Europeans had to be formed in Alexandria on July 10th to succour the beleaguered inhabitants.*

At Mansourah, Dr. Dutrieux found in the hospital a few useful drugs, broken instruments, and a very apathetic staff. The dispenser objected to applying to Cairo for necessary drugs on July 21st, when there were 23 deaths per day, on the grounds that the epidemic was practically over.

Among the native doctors who specially distinguished themselves, however, by useful and zealous work was Dr. Mahmoud Bey Sidky, who did good service at Mansourah in July, and afterwards at Tantah.

In the meantime the cholera, in defiance of cordons, continued its march up the Damietta branch of the Nile, and invaded Samanoud on June 30th, and two days later Cherbine and Dakerness.

Alexandria was invaded by fugitives from Damietta and other towns, loudly clamouring for passages to Europe. So early as June 25th, a Greek from Mansourah died after a few hours' suspicious symptoms, and on July 2nd a recognised case of cholera was reported, followed by another on July 3rd, upon which a cordon was put round the infected houses, and the inhabitants were sent in quarantine outside the town for seven days.† Dropping cases continued till August 17th,

* Blue Books, Commercial, No. 22. (1884), p. 8.

† Rapport de la Commission d'Alexandrie pendant l'épidémie de 1883. Cairo, 1884. Le choléra en Egypte, Dr. Iconomopoulos. Cairo, 1884, p. 40.

when 50 deaths from cholera occurred, but in spite of the evident presence of the epidemic, an irritating cordon was maintained till August 13th. At this time I arrived in Egypt myself, and saw cases of disinfectants from uninfected Europe being gravely perfumed by officials in Alexandria before they could be received into the town.

During the first days of July an extraordinary commission of officials, consuls, and doctors set energetically to work to keep streets clean, houses whitewashed, refuse burnt, markets, slaughter-houses, and native quarters inspected, with special sub-committees for disinfection, public latrines, and drinking water.

Perhaps the most practical thing done at this time was to remove fœcal matter by boat to a distance of six miles from the port. This was found extremely expensive, and the work was stopped on August 19th, because it was thought that the epidemic in Alexandria was at an end. As a matter of fact, cholera deaths were registered until October 7th, when, after an intermission of 11 days, the disease re-appeared in a neglected insanitary suburb, and did not finally quit the town till December 26th. The registered cholera deaths numbered only 916, which compares very favourably with the 1865 epidemic, when 3,998 people died. But Dr. Iconomopoulos has pertinently pointed out that there was a great and unexplained tendency in the statistics for deaths from ordinary disease to increase in number during the epidemic, contrary to the usual custom. The daily average deaths of Alexandria vary from about 16 to 22, and these were the figures previous to the cholera explosion of 1883, but no sooner had the plague manifested itself than the ordinary deaths were raised to above 40, and even to 52 per day (August 13th). He calculated that the real number of deaths was about 2,000, the missing cases having been hidden by the faulty diagnosis of midwives and barbers, who, among other entries at this time, certified to 92 deaths from asthma, 573 from convulsions, and 207 from aphthæ! The Alexandria sub-committee specially charged with the superintendence of the Ramleh quarter sent in its final report on September 14th, and in the distribution of some well-deserved praise, it specially commends the efforts of its member, who was made responsible for the native village of Chatby. In defiance of this cholera broke out in Chatby on October 18th, and quickly spread to Alexandria, causing a rapid and frightened exodus of Levantines to Cairo. However much praise one ought to give to the energetic townsfolk, who had apparently kept the foe at bay, it must be conceded that the special commissions were prematurely dissolved, and that the natives had been too early allowed to return to their ordinary unclean habits. It is significant that soon after the embargo had been removed from the sale and transport of hides and rags, cholera appeared among the workpeople of the tannery. The infected part of the village was evacuated the same day that the disease was reported, and this, perhaps, accounts for the recrudescence which at once took place in the different quarters of Alexandria. A commission was at once sent to Chatby to report, and the writer was one of those asked to inspect the village. A filthy almost stagnant canal

runs through the village, and in addition to conservancy purposes, drainage of tanneries, and cemeteries, it is occasionally used for drinking water. The outbreak was immediately preceded by rain upon two days, by easterly and southerly winds, by great stagnation of air, and by a rise of the maximum thermometer from 70° on October 10th to 84° five days later. The meteorological conditions had probably as much to do with the outbreak as the two theories started at the time, viz., effluvia from the tanneries, and release of cholera germs from insufficiently buried corpses by the medium of showers of rain.*

We must now return to July 1883, during which month the whole of the Delta became involved, and the disease slowly travelled up the Nile through Middle Egypt. The probability is that the primary cases were never reported, partly from the absence of intelligent local doctors, and partly from the not unnatural desire of the inhabitants to ward off cordons as long as possible. But, on July 6th, cases were reported in the Shubra district, a suburb of Cairo. On the next day the first cases were heard of from Faraskoor, the nearest town to Damietta. On July 10th cases were seen at Zifta, Talka, and Shibeen el Kom, and the following day Mit Gamr and Belbeis were known to be invaded. Shibeen el Kom is the chief town of Menoufieh province, and enjoyed the sad fate of suffering more than any other of the Egyptian towns. Numbering hardly more than 16,000 people, 1,563 deaths were officially registered, the daily mortality reaching 150 on July 23rd. Dr. Tsamis believed that there were actually 10,000 natives attacked by the disease, and he attributed both the quantity and the intensity of the poison to (1) the restraint of the cordon which kept 16,000 folk, and more than 7,000 head of cattle dying of rinderpest in unusually foul air, (2) the accumulation in the middle of the town of 5,000 stinking hides from cattle which had died of the plague, (3) the total absence of all hygienic measures in spite of the reiterated proposals of a special international commission.† Dr. Dutrieux‡ also points out that on July 26th the town was in a state of lamentable filth, and that he saw natives, after the trying fast of Ramadan, drinking eagerly from very impure canal water. By this canal he saw natives washing a cholera corpse, while their friends a little lower down took their daily drinking supply. The cemetery of the town smelt so unpleasantly that, at a distance of 30 yards, even the natives held their noses. In the neighbouring village of Louat, more than 1,000 head of diseased cattle had been slaughtered, sold, and eaten. The provision provided by Government for fighting cholera up to July 26th consisted of four kilogrammes of carbolic acid and two barrels of ehloride of lime, and this was intended for the whole province.

[Shibeen el Kom would seem to have been somewhat neglected by the central authorities, for when I visited it officially in February 1884, I found the so-called hospital was a barn, without floor, roof, or glass in

* Blue Books, Commercial, No. 22 (1884), p. 14.

† Dr. Iconomopoulos, page 38.

‡ *Le Choléra dans le Basse Egypte en 1883*, par Dr. Dutrieux Bey Paris, 1884, p. 45.

the windows, without furniture, excepting drugs and a very old box of instruments. There were sometimes 14 patients in hospital, but at my visit there were only four, all prisoners, besides some large snakes which coiled about the rafters. Of the nine mosque latrines, I found that four emptied into the drinking canal, and that five were discharged into open ponds in the town.]

On July 14th, cholera was found opposite Cairo, in the little town of Ghizeh, and the next day it broke out in Cairo itself. During the next week it attacked, among other places, Mehallet el Kebeer, Kalioub, Simbellaween, Tantah, Ismailia, and Suez. In the last 10 days of July the remaining towns of Lower Egypt were invaded in the following order:—Benha, Rosetta, Zagazig, Atfeh, Tookh, Damanhour, and Dessouk. Without, however, expending too much of its force on unsundered towns of the Delta, cholera slowly invested the villages of Upper Egypt, reaching Minieh on July 25th, Benisooef and Assiout on 29th, the Fayoum and Girgeh on August 3rd, Keneh on August 12th, and Esneh on September 10th. At Assouan there were five cholera deaths about the middle of November, and here the southward march of the pestilence seems to have been arrested. South of Assouan it must be remembered there are no densely populated towns, while the great dry heat and expanse of desert are both inimical to cholera progress.

It can easily be understood that the British Government was by no means indifferent to the spread of this epidemic in Egypt, and Surgeon-General Hunter was specially sent from England to report upon it. He arrived in Cairo on July 26th, but was obliged by ill-health to leave Egypt on September 17th. The Egyptian Board of Health had stoutly maintained at first that they had sufficient doctors to cope with the epidemic, but this was afterwards found not to be the case, and for six weeks, dating from August 2nd, 12 English doctors did all that strangers could to introduce elementary sanitation into provincial towns. They were followed, at the end of August, by the arrival of eight English medical men from India, accompanied by 40 Mussulman hospital assistants. They made many suggestions for reform, for which they were thanked with unfailing courtesy. These 20 doctors were paid at a high rate (100*l.* a month besides all expenses), and the Egyptian Government bore their departure with great resignation. It may be mentioned here that Professor Koch and three assistants spent two months in Egypt, from September to November, and in examining the dejects of 12 cholera patients, and the bodies of 14 others, the comma bacillus was first found in Egypt and afterwards re-discovered in India and at Toulon. About the same time there were two other scientific missions in Egypt, one sent by the Russian Government under Dr. Eek, and the other under Dr. Strauss, sent from Paris in August, a most promising member of which fell a victim to the epidemic.

Cholera in Cairo.—Epidemic cholera having been officially declared on June 24th to exist in Egypt, a special sanitary commission of European and native notables, under the presidency of the prefect of

police, was appointed for the protection of Cairo on July 5th, but the actual work of the local committees was not begun till July 12th. This was none too soon, for on July 14th the disease broke out at Ghizeh, whither it had been conveyed by boats laden with timber from Lake Menzalch. The town was at once invested by a cordon, but this was removed soon after cases had occurred at Boulak on the night of July 14th. Still, on July 20th a harmless party of six English were prevented from driving to the Pyramids. Boulak, the old part of Cairo, is the most densely-populated district of the city, and therefore the most insanitary. In addition to the habitual absence of all cleanliness, there were in Boulak depôts of raw fresh hides, of rags waiting to be sorted, of putrefied fish (fisikh), and a dense mass of mud huts with an intervening space of seldom more than six feet. These huts are unventilated, with roofs covered with animal excrement for future fuel, and with floors of alluvial soil soaked with organic matter resulting from generations of human beings and of their cattle and poultry.

Boulak, it was calculated, had a population of 53,000 at the onset of the epidemic, and lost 2,859 by cholera, the maximum having been reached on July 23rd, when 273 deaths were registered. The sanitary inspector of Cairo calculated that there were about 1,000 cholera deaths in Boulak alone (included in above figure, 2,859) which were not officially recorded.* One third, and perhaps more, of the total mortality in Cairo could be traced to the Boulak quarter, where cases continued to occur till August 21st. Next to Boulak, Old Cairo was the quarter which was most severely smitten. Cholera appeared there on July 17th, and lasted till August 14th, causing 964 deaths among a population of 20,000, 93 deaths having occurred on July 30th. Old Cairo is now a huge cemetery, and it was believed that the insanitary burial customs of both Mussulmans and Copts had something to do with the severity of the disease. The Abdeen quarter, with a population of some 36,000, lost 535 people between July 20th and August 21st, the maximum of 52 having been reached on July 27.

Needless to say every one of the 12 districts of Cairo was in its turn attacked. The one which suffered least was the Gamaliych, where only 79 deaths occurred between July 22nd and August 9th, the maximum mortality (10) being reached on July 30th, from a population of about 29,000.

The total mortality in Cairo was reckoned at 6,650 on a population of about 350,000, the maximum being (more than) 558 on July 24th. The daily deaths always surpassed 300 from July 21st to August 3rd. The European residents of Cairo who, under ordinary circumstances, number 22,000, were many of them absent during the summer months to escape both the heat and the cholera. Excluding the army of occupation only 126 deaths were reported among them, viz.: 40 Greeks, 30 Italians, 19 French, 14 English, 13 Austrians, &c.

* Rapport sur l'épidémie du Caire en 1883 par Dr. Ahmed Handy Bey. Le Caire, 1884, page 23.

Three reports of Commission Spéciale Sanitaire. Le Caire, 1883.

Cairo was pest-ridden from July 14th to August 24th, and during those six weeks many were irresistibly reminded of Kinglake's account in "Eothen" of one of the last outbreaks of plague at Cairo, when there were reported to be from 500 to 1,200 deaths a day.

There was the same panic and flight among all classes deeply imbued, fear of individual contagion, desolation in the streets, and an atmosphere of great moral depression, only to be temporarily cheered by the encouraging presence of fires in the streets, and rendered more acute by the constant passage of funerals and noisy mourners.

The Royal family showed an excellent example to the upper and middle classes. H.H. the Khedive won golden opinions by visiting some of the infected centres for himself, and lost no opportunity of thoroughly inspecting cholera hospitals.*

Prince Ibrahim placed a large factory at Boulak at the disposal of the committee, and a temporary hospital with 100 beds was opened there on July 24th. Prince Hassan gave many cases of medicines, and even offered the loan of his palace.

Upon July 23rd, at the height of the Cairo epidemic, an "Extraordinary Superior Commission" was appointed, consisting of the native ministers and three British generals. Their first act was to authorise the evacuation of some of the overcrowded mud hovels of the poorest classes, and the destruction by fire of those pronounced unfit for future habitation. The number of inhabitants thus dislodged was about 6,000, two-thirds of whom were provided by the Government with ample accommodation and food at the Barrage, about 18 miles north of Cairo, the remaining third, owing to the want of supervision, were allowed to disperse to the villages.† This Barrage emigrant camp was a great success, and though the occupants came from the most infected districts only 74 deaths took place among them. Some 20 deaths occurred in another camp at Tourah, where 600 natives had been previously sent.

It should be noted that the burnt huts were not the property of the evicted inhabitants, and it is only to be regretted that the Government did not follow up this salutary measure by preventing similar huts from being erected after the epidemic was over. At the end of August the emigrants were allowed to return to a temporary camp at the west end of the Nile bridge, and were then gradually drafted into the town.

Besides all the obvious schemes for surface sanitation and for preventing the filthy habits of the population the special commissions organised an ambulance service for the transport of sick to the hospitals, consisting of 17 carriages and 85 bearers with stretchers. The constant funerals passing through the city were objectionable from two points of view. The noisy chants of the mourners added to the alarm of the citizens when heard some scores of times a day, and the processions

* In former epidemics the ruler of Egypt had usually fled the country.

† Blue books. Commercial, No. 39 (1883). p. 50.

were therefore ordered to wend their way through the less frequented streets. According to the Mussulman custom, their dead are not buried in coffins, but carried to the cemetery in open wooden biers merely covered by a shawl, and it used to be a daily occurrence to see the mourners returning from the funeral *sitting inside the bier*, which was carried back on a trolley drawn by a donkey. The same biers and same shawls were used over and over again. A number of closed biers lined with zinc were provided gratis, and policemen were told off at the cemeteries to see that all grave clothes were either buried or burnt. The funeral customs of the natives do not cease to be objectionable upon the arrival of the dead man at the cemetery. The corpse is placed not in a grave dug out of the ground but in a tomb above the ground with an arched roof. The tomb is insecurely sealed by a plastering of mud; the roof often cracks, and a free escape of noxious gas occurs so long as the body is putrefying. This accounts for the evil smell which is present in most Egyptian burial places.

During the height of the epidemic in Cairo some 300 wood fires were daily burnt in the streets, and certainly produced an excellent moral effect on the population. Some 400*l.* was expended by the committee upon tar and sulphur for these fires.

Cholera among British Troops in 1883.

As early as June 25th, sites for cholera camps were chosen by the authorities, and other arrangements were made in view of an outbreak among the Army of Occupation. The disease, as I have shown, broke out in Cairo on July 14th, and on the 20th, when the cholera deaths had reached 174, and an English girl had died in the Boulak quarter, it was decided to send two regiments to Suez. On the evening of July 21st the first case in the English army occurred and proved fatal in a soldier of the "Black Watch" at Suez.*

On July 24th, in consequence of cholera having attacked English soldiers in both their hospitals, and in Kasr-el-Nil, and the citadel barracks, all patients who could be moved were taken to a desert camp at Helouan, 12 miles from Cairo, and here cholera cases occurred daily among them from July 26th to August 8th. The Royal Sussex Regiment was sent from Cairo to Ismailia, on the Suez Canal, on the night of July 24th, but cholera showed itself among them there on the afternoon of July 26th. The mounted troops were moved by train to El Warden, 30 miles N.W. of Cairo on July 25th, but on July 27th, 10 cholera cases and six deaths occurred, quickly followed by others. By July 27th, cholera was established everywhere among the troops, and further moves were carried out with the least possible delay, but no cases happened after August 23rd.

* Army Medical Reports by Surg.-Gen. Irvine and the Director-General. Vol. XXIV. p. 281, and Vol. XXV., p. 116. London, 1884-5.

Fifteen cases only occurred among the troops at Alexandria, and all those were in the Ramleh Hospital, of which 12 were fatal between August 3rd and August 23rd. The shortest fatal case terminated in two hours, the longest in 76 hours.

The strength of the Army of Occupation was 6,650, 194 were attacked by cholera, and 142 of them died. It will be seen that the number of attacked was small, but the number of fatal cases very great, showing extreme virulence in the type of the epidemic, for 19 cases died in less than six hours, 45 others in less than 12 hours, and 40 more died under 24 hours.

Surgeon-General Irvine writes, "there is no doubt that the troops " moving into camp carried the disease with them, and it manifested " itself after their arrival," and indeed it seems evident that if troops are to exchange comfortable, cool quarters for unwonted fatigue and exposure to shadeless desert during the hottest time of the year, they should complete all their primary moves before cholera has actually broken out among them.* Barrack accommodation, per man, during the summer was 1,150 cubic feet, and 60 feet superficial. In his most interesting Report he points out that the Hospital Corps suffered out of all proportion to other branches of the army. One hundred and two non-commissioned officers and men were employed in various hospitals, and of these some 45 were engaged in nursing cholera patients, 16 were attacked by the disease, and 13 died. Further, 80 orderlies were employed as supplementary nurses, and of that number 17 were attacked and eight died. Surgeon C. B. Lewis fell a victim to zealous work, while several other doctors suffered from choleraic diarrhoea, and here it may be noted that though it was agreed on all sides that the Army Medical Department behaved throughout in the most exemplary way, no sort of official recognition was ever made of the usefulness of their labours. If combatants deserve promotion and decorations at the close of a campaign, it seems illogical not to distribute suitable rewards to those who risk their lives and health in striving to protect an army from a plague which is in their midst.

Cholera in the Egyptian Army.

On July 19th, two houses at Abbassiyeh were prepared for occupation by any cholera cases which might arise among the native troops, whose average strength at that time was 3,645. On July 22nd the first case was seen, quickly followed by seven others; in all 86 men were attacked before August 25th, and 36 of them, including one officer, died.† The Egyptian doctors were not favourable specimens of their

* The Alexandria troops remained stationary in their barracks and totally escaped cholera, but it must be remembered that that town has the advantage of a cooler climate, and was less subject to the 1883 epidemic than Cairo.

† Blue Books, Commercial, No. 39 (1883), p.p. 8-11. Dr. Acland, St. Thomas' Hospital Reports, Vol. XIII., p. 269.

class, two of them demoralized the orderlies by their personal fear of the disease, and the early patients were placed within a circle of chloride of lime, into which the medical man was loth to enter. Various squirts and perfumes were also freely used by the medical authorities. The sick were then entrusted to the late principal medical officer of the native army, who has since turned chaos into a valuable department. In his efforts for cholera patients he was nobly seconded by the English officers, who nursed the Egyptian soldiers by night and day with their own hands.

Many of them suffered at the time from the diarrhœa which so often accompanies a cholera epidemic, and the Commandant of the hospital almost lost his life from enteric fever contracted at that time.

Statistics of 1883.

The extraordinary expenditure incurred by the Egyptian Government on account of the epidemic amounted to more than 65,000*l.*, but to this must be added an unknown amount for interference with the country's commerce and revenues. The death returns are considerably below the real figure, for the published official bulletins give 582 as the cholera deaths during the last nine days of June, 12,689 at the end of July, nearly all from Lower Egypt, 27,294 on the last day of August, and only 28,083 on September 30th, when the epidemic was practically at an end, and a grand total hardly exceeding 28,300. The daily mortality was very high for a month after July 20th, and reached its maximum in the first week of August.

During the epidemic the Board of Health was too demoralized to control the statistics, many of the registration clerks had been withdrawn from their posts, and many errors of at least 100 per cent. were discovered in the death returns. When the epidemic was all over, a friend whose name I am not at liberty to mention, spent some months in searching and tabulating the returns of all Egypt. He found that the cholera mortality actually reached 58,511 between June 22nd and December 26th, the death-rate among males being very slightly higher than among females. In 1865, the cholera (official) death total was 61,192, and taking the only available comparative statistics (eleven), it is found that the average duration of 1865 was 61 days, compared to 48 days in 1883.

A glance at Table II. shows how Damietta was punished for her sins. The comparative immunity of Alexandria (916 deaths compared to 4,142 in 1865) was thought to be partly due to the open spaces in the town resulting from the previous year's fires and destruction of houses, but it must be remembered, too, that it is fortunate in possessing a very carefully superintended water supply.

TABLE II.

—	Popula- tion.	Cholera Deaths.	Mortality per 1,000.	Duration of Epidemic in Days.	Remarks.
Alexandria -	225,396	916	4.06	178	(Recrudescence.) 3,262 left through panic.
Cairo -	371,576	6,650	17.89	40	
Rosetta -	19,378	233	12.02	25	
Damietta -	43,616	1,927	44.18	53	
Port Said -	16,560	8	.48	10	
El Arish -	3,923	—	—	—	
Ismailieh -	3,864	40	11.89	22	
Suez -	11,115	20	1.79	28	
<i>Provinces.</i>					
Behera -	398,856	939	2.35	59	(Recrudescence.)
Garbiyeh -	929,488	15,501	16.67	63	
Menoufiyeh -	646,013	9,372	14.51	67	
Dakhalieh -	586,033	6,337	10.81	67	
Sharkieh -	464,655	2,945	6.33	58	
Kalioubiyeh -	271,391	1,837	6.77	56	
Ghizeh -	283,083	3,996	14.11	61	
Benisouef -	219,573	996	4.53	44	
Fayoum -	228,709	786	3.43	28	
Minieh -	314,818	1,769	5.62	40	
Assiout -	562,137	1,544	2.75	79	
Ghirghbeh -	521,413	1,994	3.82	35	
Keneh -	406,858	526	1.29	64	
Esneh -	237,961	175	.73	37	
	6,765,976	58,511	8.65		

Causes of 1883 Epidemic.

The cause of this outbreak is and always will be involved in some mystery. The two theories started at the time, and debated with some heat, were (1) that it was directly introduced from Bombay, and (2) that cholera had been endemic in Egypt since 1865.

Now Bombay had been for some months rather more free than usual from cholera, and it became necessary to try and prove that one or more individuals had imported the disease direct from Bombay to Damietta. The first suspected was a fireman. It is a little doubtful whether cholera did not precede his arrival at Damietta, but even supposing that he reached it before the explosion, it was quite certain that he did not come from an infected ship, that his own disease was alcoholism and not cholera, and that the Damietta men whom he was supposed to have infected only became cholera stricken eight or nine days afterwards, when the daily deaths of the town had already reached 101. The second case brought forward was as deficient in proof as the first, and was temperately and ably handled by Dr. Simpson, who spent four days at Damietta for this special purpose.* A woman named Zendaia was accused of having brought the disease from Port Said to

* Blue Book, Commercial No. 22, 1884, p. 30.

Damietta, but on investigation it was proved that she became infected at Damietta, and was one of those who conveyed it to Port Said, where she was taken ill on June 27th or 28th. Cholera has never been traced in Egypt as having been directly brought by ship from India, though there are now steamers which make the voyage in 10 or 11 days.*

The endemic theory cannot be dismissed in so few words. Sir Guyer Hunter reached Egypt on July 26th, and on August 19th, after an inspection of Cairo, and three days spent among the provincial towns, he entertained "grave suspicions of cholera having been endemic in Egypt since the epidemic of 1865."† His further researches tended to confirm his suspicions; and before discussing the theory it may be noted that of all the scientists and doctors then busily studying the question, only three or four, all unacquainted with Egypt, agreed with him. His chief disciple, Dr. Dutrieux, had some reputation as an African traveller, a writer, and an oculist, but none as a medical observer. He published the theory that bovine typhus had been able to produce enteric fever, bilious typhus, walking typhus, and spotted typhus, and that cholera was the next link in the metamorphosis. The lay newspapers twitted him at the time by asking whether one variety of fruit stone planted in an orchard would produce apples, pears, plums, and oranges!

Sir Guyer Hunter gives two reasons for his belief that cholera in Egypt was endemic, the great annual prevalence of diarrhœa, and the recurrence from time to time of cases loosely called cholérine, cholera nostras, etc.

Together with all other observers he points out that the diarrhœa which immediately preceded June 1883, may have been due to contamination of water by carcasses, or to the large amount of diseased meat which was eaten by the poorer natives, consequent on cattle plague. But in most years there has been no murrain among the herds, and therefore some other cause must be found. If statistics are studied it is found that the chief diarrhœa death-rate of Egypt is in children under five years of age and in the summer months.

The monthly mortality after the age of five years does not vary much during the year, it is always high.

And we may go a step farther, for even in children between the ages of one and five there is no very great difference between the summer and winter months. But directly we come to the case of native children under one year we see a startling difference. To take Cairo alone, infants under one year die during the cool months at the rate of less than 400 a month. During April and May their death-rate gradually mounts up till in June, July, August, and September, it is very high indeed, even reaching 800 a month in August. In October it has fallen again to less than 400 a month. The death-rate is chiefly from diarrhœa and occurs not only at the hottest time of year, when

* See paper read by Dr. Koch at Berlin Conference, in July 1884. *Erforschung der Cholera*. Berlin, 1887.

† Blue Book, Commercial No. 38, 1883, p. 1.

infants drink water in addition to their mother's milk, but it must be noted that the highest mortality corresponds with the season of lowest subsoil water, and the beginning of its rise. The Egyptian does everything he can to pollute his water supply, and makes no rational attempt to dispose of his sewage. The consequence is that diarrhœa, dysentery, enteritis, and whole families of entozoa are endemic in Egypt, but this is not a proof that cholera is endemic. As an extraordinary fact, perhaps, due to some racial immunity, enteric fever is very rare among the native population, though common enough among Europeans.

It may easily be conceded that the so-called cholérine and cholera nostras have no clinical dissimilarity to cholera, and that all cases covered by such unsatisfactory terms would be considered true cholera during an epidemic. As against this it must be remembered that during an epidemic many cases of simple diarrhœa are covered by the name of cholera.

It may be that bacteriology will discover to us the difference between true cholera and the apparently sporadic cases which occur dissociated from all endemic and epidemic trace of the disease. The practical difference between true cholera and the doubtful cases is that the latter *can* be produced by poisonous food and fruit, are nearly always isolated, are by no means very fatal, and have no tendency to spread, apparently lacking the special *exotic* germ (whatever it may be) which is one of the necessary elements of the outbreak of epidemic cholera.

Sir G. Hunter cross-examined several doctors as to the existence of any kind of cholera in Egypt. Nine of them searched their memories and their note-books, and told him of 16 cases of "cholérine" which had occurred in the practices of themselves and their friends between the years 1867-82. There were two other cases transported from Italy, and many recollections of the years 1865-6, when cholera was present in Egypt.

It is significant that of these 16 cases no less than 13 recovered, while an Italian and a Greek lady died, and also a man after eating pickles. It is upon these 16 cases during 16 years that the endemic theory is founded. Similar cases occur every year in Europe, as Sir G. Hunter himself confesses (p. 41), and at least two or three cases caused some excitement in London at the end of August 1890.

There is, of course, a tendency in all countries to suppress or modify the diagnosis "cholera" in death returns, if it is believed any unreasoning panic might result from its mention, but in Egypt there were considerably more than 100 European doctors, unconnected in any way with the Government, and it can hardly be supposed that they had entered into a league to suppress the existence of cholera, if it really existed in the country. Moreover, as many of them had served through previous epidemics it cannot be maintained that they were not conversant with the disease.

So far as I know there was nothing in 1883 to justify the opinion that cholera was endemic, and though I have paid some attention to the subject for eight years, I know of no arguments which have occurred in its favour since. The epidemics of 1848 and 1865 were each followed by a postscript outbreak in the succeeding year, and I fully believed that in 1884 we should have another manifestation in Egypt. In February 1884 I was appointed to the head of the reorganised Sanitary Department of Egypt, and carefully looked out for all cases and all rumours of suspicious sickness.

I was rewarded by hearing of the following cases which I published at the time.* At the end of April 1884, three suspicious cases, not fatal, occurred among English soldiers in Cairo. During May four other cases were seen by four European doctors, none fatal.

In June an outbreak of diarrhoea and vomiting was reported to me from Damietta, this was due to salted drinking-water, and it is certain that no one died there from cholera.

In July one case, not fatal, certified as "*cholera nostras*" occurred at Alexandria, and was seen by many doctors. The only other case which could be heard of that summer was on board a French steamer, which had just come from Marseilles, then cholera-ridden.

There may have been two or three similar cases every summer, but I know of no others till the summer of 1886, when two cases occurred in Alexandria, a Dane who recovered, and in whose motions the comma bacillus could not be found, and another who was poisoned by sausages, but not fatally.

In 1887 I saw a fatal case after eating melon, which has not been reported.†

The only other case that I know of was an English soldier in the spring of 1889, who had very suspicious symptoms, but recovered.

Condition of Damietta.

In spite of belief in the necessity of an *exotic* germ for the production of a cholera epidemic, there can be no doubt that Damietta in 1883 possessed all the known requisites for engendering filth disease. In addition to the predisposing causes common to the rest of Egypt, a flat alluvial soil, soaked with decomposing organic poisons, drinking water soiled by every imaginable means, heated stagnant air, an apathetic population, and a poverty-stricken indifferent Government, Damietta

* St. Thomas's Hospital Reports. Vol. XIII., p. 351.

† He was an English prison warder, æt 37, and died on June 15, the third day of the disease, which was called "*choleraic diarrhoea*." He had shrunken skin, typical face, empty bladder, but resonant abdomen and liquid brown offensive motions. T. in rectum 105°, R. 36, P. 114, just before death. At the autopsy, 16 hours later, rigor mortis, hands and feet shrunken, congestion of left lung base and of abdominal organs. His right heart contained liquid black clot, the left was contracted, pale and containing no clot, but a little liquid dark red blood. The intestines were slightly inflamed throughout, no ulcers, but Peyer's patches and solitary glands standing out too well. Stomach was congested and bile stained with brown contents, chiefly milk and brandy.

had, unfortunately, at least five other dangers, which affected chiefly the natives of the most crowded and insanitary part of the town. The richer inhabitants drew their water supply from cisterns filled from the Nile at its height, but the poorer folk living in the quarter of the town where cholera was first seen and was most rife, were entirely dependent for drinking water upon a low Nile, for several weeks below sea level, and therefore extremely brackish, or upon an open canal-drain which ran through the town and received the sewage of houses on its banks, and also of the public latrines attached to many of the 60 mosques in the town.

These conditions prevailed every May and June, but in 1883 must be added the wholesale contamination of the Nile by carcasses of cattle which had died of bovine typhus. One Englishman says that he removed during two months more than 2,000 carcasses in every stage of putrefaction, the greater number being from the Damietta branch of the Nile.*

The air of the town was in a very poisonous state, and was not remedied by the depôts of stinking salted fish (fisikh) arriving from the neighbouring lake of Menzaleh for the consumption of Damietta and the rest of Egypt. The last of the exciting causes special to Damietta was the fair, which immediately preceded the cholera explosion (June 13-20). Some 15,000 people had been allowed, without any sanitary supervision, to encamp on the outskirts of the town and to overcrowd the existing 30,000 inhabitants.† The wonder is not that cholera appeared, but that any remained alive to debate its origin.

In June 1891, I visited Damietta in order to see how far sanitary improvements had taken effect. The existing cisterns are cleaned out and refilled every year, and a large new one built by the Government supplies the town for two months and a half. Moreover, a new circular fresh-water canal has been excavated, bringing Nile water from near Cairo, and the central canal-drain of the town has been filled in and converted into a road. The river and the canals no longer contain dead bodies, and the local fair has been shorn to harmless dimensions. The sale of decomposed fish still goes on, and brings in a considerable revenue to the Government.

Diarrhœa preceding Cholera.

Dr. Simpson points out‡ that in the first five months of 1883 there was a great increase (398 to 590) in the death-rate of Damietta compared to the previous year, and that, whereas in 1882 the diarrhœa entries reached only 104 for those months, the figure rose to 198 in 1883. Again, at Assiout, cholera was not reported till July 29, 1883, but Dr. Haddad found the death-rate for the first seven months of that year was 693 compared to 513, the average of the two previous years. Also that more than one-third of the total deaths were returned as

* Warm Corners in Egypt. London, 1886. Page 200.

† Le Choléra de Damiette, par Dr. Chaffey Bey. Alexandria, 1883. L'épidémie cholérique de 1883, par Dr. Dacorogna Bey, 1884.

‡ Blue Book No. 22 (1884). Page 31.

diarrhœa. In Alexandria the deaths from bowel complaints in the first five months of 1883 were 860, while in 1884 there were only 313. A similar high rate during the early months of 1883 could probably be discovered in most Egyptian towns, but in Cairo I find that there were only 2,266 diarrhœa deaths compared to 2,027 in 1884.

Egypt is, as regards sanitation, a great deal more than 35 years behind England, but it is interesting to compare for a moment the 1883 cholera in Egypt with that of the British Isles in 1848. Both these visitations were preceded by an unusual amount of typhus fever, and both occurred in populations so accustomed to diarrhœa that they thought nothing of it even in an epidemic form, and seldom sought intelligent advice for it. Indeed, over the whole of Europe and in every town and village in England, wherever cholera broke out, it was preceded by an enormous amount of diarrhœa.* From Russia, Berlin, Hamburg, and other cities came the same story of great looseness of the bowels among all classes of people. In the British Isles, a system of house-to-house visitation to try and cope with premonitory diarrhœa in its first stage led to some interesting results worth quoting.

In Glasgow 13,000 cases of premonitory diarrhœa were visited, of which less than 1,000 had advanced to the stage of rice-water purging. In London, medical visitation was begun at a time when the weekly cholera deaths had reached 2,026. Some 43,737 patients with premonitory diarrhœa were visited, and 52 "passed into cholera after treatment"; 1,758 cholera cases were also seen. Dr. Sutherland wrote very strongly at this time, "that the whole force of the medical preventive measures should be directed against the earlier stages of the disease."

As at Damietta in 1883, it was pointed out that the cholera of 1884 at Marseilles and Toulon was preceded for several months by an excess of diarrhœal disease.†

This epidemic diarrhœa must surely have been caused by impure drinking water.

After 1883 Egypt enjoyed a respite from cholera and the fears of that scourge till 1890, when she found herself seriously menaced by two near neighbours, the southern Hedjaz and northern Syria.

Cholera at Mecca in 1890.

On July 28th, the second day of the fête, cholera once more broke out in the village of Mina, and it is satisfactory to know that the news reached Alexandria and Constantinople the following day. The earliest victims‡ were from among the soldiers of Jeddah garrison, and Turkish sailors who were encamped near caravans which had already had a high death-rate. It is believed that the poison was carried by caravans from the Persian Gulf, which is only 17 days from Mecca. Since August

* Reports of Boards of Health on Cholera of 1848-49. London, 1850. Page 104, &c.

† Le Choléra et les Quarantines. Dr. Dutrieux. Bruxelles, 1884. Page 49.

‡ Reports of Dr. Ardouin Bey and Dr. Ebëid, Alexandria, 1891.

1889 the enemy had been lurking about Mesopotamia, and in May 1890 had attacked Mosul, Van, and Diarbekir. From Mina it lost no time in spreading to Mecca, Jeddah, Medina, Yambo (August 31) to Massowah in September. Excessive heat and southerly simoon winds prevailed during the summer months, while heavy rain unfortunately fell on the day of Arafat, July 26.

One hour after the first case was heard of, there were three others; after another hour 13 deaths, and the following day, when everyone was hurrying back to Mecca, many dead were lying by the roadside.

At Mina there was a complete absence of drugs, disinfectants, hospitals, &c., and from a private account I learn that doctors were urgently wanted at Jeddah, for the greatest unpreparedness was everywhere present. The pilgrims embarking at Jeddah for the pilgrimage were 39,429, and at Yambo 4,067, and there are said to have been 20,000 from the Persian Gulf. In the absence of reliable statistics we must suppose that the numbers were as usual, between 80,000 and 100,000. The official death-rate from cholera at Jeddah was 135 out of 12,000 pilgrims who had hurried there on August 4th, then it fell to 76 and 79 on August 10th and 11th, on which days it was still 108 and 117 at Mecca.

"The death-rate was put down as 400-500 per day, but it is firmly believed in Jeddah that the total mortality in the Hedjaz during about three weeks was 25,000 to 30,000, numbers of whom died from starvation."*

An enormous number of pauper pilgrims furnished ready fuel for the epidemic, for they lay about the streets eating and drinking any filth that came to hand.

The Egyptian Government might perhaps rather more energetically prevent their share of paupers from leaving on the pilgrimage, and as many of the Hajjis elect to spend the month of Ramadan in the Holy Places, it might be well to send the medical officer detailed by the Alexandria Quarantine Board some three months earlier than is the custom. In 1890 their doctor reached Mecca on July 24th, only four days before the epidemic was reported. If one might dare to give advice to the Board, it would be to send an older and more experienced man to the Hedjaz, who would perhaps be able to induce the Turkish authorities to consider sanitary questions. Turkey is quite certain not to introduce any satisfactory reforms unless pressure is put upon her by Europe.

At Jeddah (22,000 inhabitants) she provides six doctors, one of whom draws as much as 720*l.* a year. At Mecca there is an inspector at 600*l.*, besides 10 other doctors and a budget of 4,000*l.* for sanitary measures.

Mecca (110,000 inhabitants) is of course extremely crowded during the holy season, so that 3*l.* or 4*l.* are paid for one night's lodging, and 30 people crowd into a small room to divide the expense.

* Report of the Haj of 1890.

The houses are provided with cesspools which are seldom or never emptied, and the latrines are too odorous for use. The drinking supply comes from the Ain Zebaida, and runs into an open reservoir of about 100 yards diameter. I am assured that the water smells, that the reservoir is never cleaned out, and that it is unprotected, so that people can throw in whatever they wish. All accounts agree that this water is contaminated by neighbouring cesspools, like the holy Zem Zem water. Mecca itself stands in a winding valley, shut in by rocky hills which reverberate the fierce summer heat.

Most pilgrims, imitating Muhammad's own practice, make their exhaustive running ceremony seven times between the hills before the sacred rites, and on the same day a jostling fanatical throng penetrates the stagnant air of the Kaaba. Then on the first day everyone goes through Mina (3 miles) to Mount Arafat, 12 miles from Mecca. The mountain is well supplied with spring water from the rock, and is about 200 feet high, with a base of one mile circumference. On the second day there are prayers at daybreak, and religious preparation for "The Sermon of the Standing" on Arafat, which lasts for the three hours which precede sunset. The newly-formed *hagag*, almost naked, exhausted with fatigue, fasting, and emotion, then hurry towards Mina in reckless and chaotic confusion, which lasts most of the night.

The third day is ushered in by prayers at dawn, and then, while some continue an orthodox but headlong flight to Mecca, others crowd dangerously in a seething mass in a narrow pass to stone the Devil's pillars. Then comes the sacrifice, mostly of sheep with a few oxen and camels, and the land begins to smell worse than any slaughter-house. Burton thought that less than 6,000 sheep were sacrificed, other writers, perhaps less accurate, have put the number very much higher. Mina village, where this takes place, is shut in by hills all round, and as no conservancy arrangements are provided for the pilgrims, and no heed is given to the remains of the slaughtered animals, it is not wonderful that the air becomes absolutely pestilential, quite preventing sleep at night. Some try to protect themselves by stuffing their noses with cotton wool, but all suffer from the heat, stench, blood-soaked earth, flies, kites, and vultures.

The water at Mina comes from the Ain Zebaida, in Mecca, and is kept in big cisterns which are said never to be cleaned out, and therefore contain many entozoa.*

Many pilgrims fly at once to Mecca to escape these horrors immediately after the sacrifices, but there are others detained there by religious scruples or by other reasons during all the three days of drying flesh.

This condition of things is quite enough to produce any pest besides cholera, and there is said to be always a great diarrhoea mortality among the pilgrims. On the day of Arafat alone there were, in 1888, 23 official deaths; in 1889, 17 deaths; and in 1890, 13 deaths.

* This account is taken partly from Burton's personal narrative of 1853, and partly from the accounts of Egyptian friends who made the pilgrimage in 1890.

Immediately after the Holy Week religion enjoins on the faithful an immediate dispersion from Mecca, which makes it easy for any existing disease to be diffused at the same time. Many proceed to Medina, but even on the desert route they are exposed to additional danger from the Bedouins. In 1886 about 70 pilgrims were killed or seriously injured on the first day of this journey, mostly by camel drivers.

The Quarantine Board, though not quite prepared for the reception and treatment of the returning pilgrims, took energetic measures during August and September to deal with the question, and it is perhaps due to their exertions that cholera did not reach Egypt. At El Tor all were subjected to 20 days' observation after the last case of cholera in the camp, and Egyptian pilgrims were subjected again to three days' quarantine and disinfection at a station 50 miles from Suez, Ras-Mallap. Some of the longest cases were kept in camps for as much as 51 days. Some 10,121 were landed at El Tor, of whom 422 died between August 11th and November 20th. The deaths included 135 from cholera, nearly all being Turks and Syrians, 123 from "marasme," and 41 from dysentery. One soldier forming part of the sanitary cordon also died from cholera. The 5,106 Egyptian pilgrims only had 31 deaths among them, viz., one from cholera, nine from "marasme," 13 from dysentery, and eight from other diseases. About 200 of the Egyptians died from cholera in the Hedjaz.

The Egyptian Government formed a special commission in Cairo, which had its first sitting on August 6th, and issued some very useful instruction. The Tanta fair was postponed, the small streets of Cairo were kept clean, and the provincial towns were made cleaner than they had ever been seen before. Unfortunately this was but a spirit, and no real improvements in public health have been recorded during the following nine months.

Cholera at Mecca in 1891.

The scourge again broke out at Mecca on July 11th, and on July 17th, the day after the sacrificial fête, 23 deaths from cholera were reported at Mina. The pilgrims hurried back to Mecca, where there were more than 400 daily cholera deaths on July 20th and 21st, the deaths gradually declining as the pilgrims left the city. On July 19th, 556 deaths were reported from Medina, and the following day cases first occurred at Jeddah, where, on July 27th, there were 30 official deaths. Early in August the disease was reported from the pilgrims at the quarantine station of El Tor. But there was no cholera in Egypt.

Danger of Pilgrimage to Egypt.

It is quite certain that returning pilgrims brought cholera to Egypt in 1831 and 1865, and it is quite possible that they may have done so in other years, such as 1834, 1837, and 1848. Statistics in Egypt are difficult to obtain, because the records for the first half of

this century are mislaid, and it is quite impossible to get information about epidemics at Mecca. It must be remembered that besides the years mentioned in Table I., cholera has been present in Arabia of late years, from 1859-65,* 1871-72, 1877-78, 1881-82-83, and again in 1890-91. In other words, during the last 32 years, cholera has been present in Arabia at least 16 times, and only three times in Egypt. This is the more important because it is only since 1858 that the pilgrims have returned to Suez from Jeddah by steamboat. Immediately after the sacrifices at Mecca, some of the pilgrims at once make for Jeddah and Suez, while others continue their pilgrimage to Medina, and return later to Jeddah and other seaports.

The earliest batch of pilgrims can never reach Egypt till the end of two weeks after the Bairam, and those who have afterwards travelled the extra 245 miles to Medina cannot be certain of reaching Suez till some month or so later. Thus in 1891 pilgrims, if undelayed by quarantine, would have been liable to reach Egypt any day during August and the beginning of September, and now every year, until at least 1897, we shall be exposed to the arrival of about 10,000 returning pilgrims during the hot summer months. Now, a careful study of the various epidemics in Egypt will show that the time to expect an explosion is June, while the potential cholera season for the whole country lasts from the end of May to the beginning or end of October. I therefore think it necessary to call attention to the fact that for the next four years the return of the Hajis will coincide with the season of greatest cholera danger to Egypt.

If the Egyptian Government considers it impolitic to prevent the pilgrimage when cholera is present in the Hedjaz, means should be taken, much more stringently than usual, to prevent paupers from accompanying the caravan to the holy places.

But it is not only the persons and the baggage of the pilgrims which may in some unknown way communicate disease. Those who can afford it bring back for their friends and for home consumption bottles of the precious Zem-zem water, said to date from the story of their ancestors, Hagar and Ishmael. This water acts as a purge, tastes and smells horribly, and when analysed in London some years ago was found to be dangerously contaminated by sewage. If it is possible to convey cholera poison in a bottle this holy water will probably do it.†

Danger of crowded Fairs to Egypt.

In 1848 the cholera poison, if not first discovered there, seems at least to have been diffused over the country immediately after one of the Tintah fairs. Again, in 1883, cholera appeared at Damietta just after the large fair there. Until we know something more about the

* Le Choléra, par Dr. Fauvel. Paris, 1868. Page 135. Cholera in East Africa. Dr. Christie. London, 1876.

† Zem-zem water is used by the devout to break their fast during the month of Ramadan, which precedes the Holy Week by three months. In 1883 it began in July.

mysterious causes of cholera, it seems not unscientific to pay attention to the various predisposing aids to an epidemic, and among these must certainly be reckoned any great concourse of Oriental people. It is a little unfortunate that the great Tintah fair takes place always in August; being a very popular one, it is attended for a week by numbers usually exceeding 200,000. The sanitary department for the last few years has done something towards making these festival camps less insanitary, and in 1884 and 1890 the great Tintah fair was prohibited.

Cholera in Northern Syria.

The seourge was officially discovered at Aleppo about September 11th, 1890, having been brought there from the Euphrates by Bedouins. It spread quickly to the principal towns and villages north and south in spite of rigid cordons. Damascus, Beyrout, and Alexandretta, however, escaped, perhaps in consequence of a good water supply. The last fatal case was at Tripoli, a town of 25,000 people, on February 15th. By the official returns Aleppo only lost 654 by cholera, but Dr. Wortabet* believes that there were at least 3,000 fatal cases, more at Hamath, and 2,000 in Homs, which is a town of 25,000. If his information is correct, it will be necessary to multiply the official returns by at least three or four. The duration of the epidemic in individual towns was about 10 weeks, and it seemed to decline after a long storm of rain and cold in the middle of November. Then followed the Tripoli outbreak in December, and after a false lull of security the pestilence again appeared at Aleppo in July 1891.

Nomenclature.

Epidemic cholera is called by a variety of names in Egypt, the most common of which are el hola (the terrible), el heada and el shota, all used exclusively for a malignant epidemic. They are also beginning to use the Greek word cholera, and sometimes make use of el howa el asfar, the yellow air, the origin of which is not certain. The word el hadith is also occasionally used, but that may be employed for any extraordinary mortality among men or beasts.

Land Quarantine.

The Vienna Conference of 1874, with only one dissentient vote, decided on the inefficacy and uselessness of sanitary cordons, but this seems to have been forgotten in Egypt, where they were freely used in 1883. In every case they were put on by the police after people had escaped from the infected town, and were invariably of great harm and of no good. They were continued in some places till the beginning of August, in spite of the fact that cholera had then overrun the whole

* *Lancet*, January 10th and May 9th, 1891.

of Lower and Middle Egypt. At the outset of the epidemic, urgently needed medicines and disinfectants from Cairo were kept outside Damietta for three days by the cordon,* and this was by no means an exceptional case. In June 1884, when we were making preparations for a possible return of the foe, I persuaded the Sanitary Committee, which was then the chief hygienic body of the country, to decide that in the event of future epidemics no attempt should be made at quarantine by land, and it is to be hoped that no future panic will cause this decision to be forgotten.

But it must be remembered that in 1884, Spain and Italy, yielding to terrified advisers, imposed quarantine of five and seven days, both on the frontier and in their own interiors.

The Sanitary Conference at Rome in May 1885 again voted that land quarantine and cordons were useless, Turkey alone disagreeing. Since then, true to her principles, she has surrounded Syrian villages with police cordons both in 1890 and 1891.

Quarantine Board.

This administration has the serious disadvantage of being international, and an analysis of its odd composition will show how difficult it must be for its members receiving various orders from their own Governments to agree on any semi-political question. Besides the English president, there are 22 members, 14 only of whom are medical men. Egypt is allowed seven members, including four English, a Swiss, a German, and an Algerian. France provides a vice-president and another member, but Turkey is represented by a Greek, Spain by a Smyrniote, Portugal by an Italian, Sweden and Denmark by Greeks, Belgium by a Syrian, and Holland by a Maltese. The Blue Books contain one notice of this department in 1883 which is interesting. Dr. Koch reports (No. 22, p. 21) that he saw 500 pilgrims landed at the quarantine station of Tor from one steamer. According to the ship's doctor, all on board were healthy, but during the disembarkation it became evident that several of them were seriously ill, and three fatal cases soon occurred in the quarantine camp.

England, relying upon domestic sanitary progress and the great sums of money expended on public health, can afford to substitute other measures for quarantine by sea, but it is difficult to see how Egypt will be able to imitate her for the present. The guardian of a powder-magazine must take exceptional care to prevent any possibility of the entrance of a spark of fire, and Egypt, with her befouled drinking water and sewage-contaminated air, cannot afford to run any risk of possible exotic invasion. Her own people are apathetic and ignorant enough, but she is exposed to the risk of neighbours even less sanitary than herself, and every year some 10,000 pilgrims return to her accompanied by an amount of filth which must be seen to be believed.

* Blue Book, Commercial No. 38 (1883), p. 28.

So long as she retains the quarantine system, however, she is bound to keep all her stations of detention in the highest degree of preparedness and sanitation.

Atmospheric Influences.

The season of cholera prevalence in Egypt, from the end of May to October, corresponds exactly with the four hot summer months, as is usually the case outside India. A high temperature favours the spread of cholera, but there is no evidence that the epidemic years 1865 and 1883 were hotter than the average.

Neither could anything seriously abnormal be discovered by searching the records of atmospheric pressure in 1883.

Egypt, with the exception of autumnal showers at Alexandria, is rainless during the cholera months, but after the middle of July the moisture in the air gradually increases in consequence of the Nile inundation.

The pure dry air of the desert seems to prevent cholera from invading the Soudan, and has apparently prevented the transport of the disease by land caravans from Syria and Arabia.* El Arich, on the desert frontier, was the only place exempt from cholera in 1883. Ozone has perhaps no effect on cholera, but it was pointed out by Dr. Kirker that the mean relative amount of ozone at Alexandria in June 1883 was only 6·4, compared to 7·6, which was the average for the previous eight Junes.† Also the mean wind force for June 1883 was less than for any previous June for 13 years, and the nine days from June 12–20th were phenomenal in showing a continued low wind force which had never occurred in summer and only twice in winter since the meteorological records were first taken in 1876. It seems rational to suppose that stagnant air would be highly useful for the development of cholera. Various writers‡ have referred to oppressive atmosphere and unusual clouds in Egypt during the epidemics of 1831, 1848, 1865, and 1883, and to various colour effects of sun and twilight, all due to moisture in the air without wind force. This condition of things is very common for a few hours in Cairo in the summer, and though very unpleasant is not associated with evident disease.

Subsoil Water.

In Calcutta, as has been shown, the maximum of cholera prevalence is from February to May. This corresponds with the fall of the subsoil water, which goes on sinking steadily till its gradual rise in May. This bears out one of Pettenkofer's laws that the maximum cholera

* In 1890 the land caravan returning from Mecca to Damascus by short stages lost all cholera *en route*, and arrived in perfect health.

† Blue Book, Commercial No. 38 (1883), p. 67.

‡ Clot Bey, Mr. Chaidufeu, Dr. Willemin, Brigade-Surgeon McDowell, &c.

corresponds with the lowest, and the minimum with the highest level of subsoil water.*

In 1890 the Sanitary Department made some daily experiments with four wells in Cairo, and though the number of wells and number of years is not great enough to be certain of accurate results, it can be roughly seen from Table III. that the subsoil water near the Nile banks is at its lowest a month later than the lowest Nile. In other words, the minimum ground water within some 500 or 600 yards of the Nile is always about the middle of July at Cairo, and this is exactly the time when cholera has usually broken out in that city (June 17th to July 15th). The subsoil water then rises gradually till it reaches its maximum in November, by which time cholera has usually disappeared from Egypt.

TABLE III.

1890.	Distance from Nile bank in mètres.	Lowest Level.	Number of Days after Nile.	Highest Level.	Number of Days after Nile.
Nile at Rodah - -	—	June 15	—	Sept. 28	—
Well in Ezbekieh quarter	500†	July 8	23	Oct. 31	83
Well at Sanitary Offices -	650	July 23	38	Dec. 5	68
Well in Saida Zenab quarter.	1,000	July 28	43	Dec. 10	73
Well in Khalifa quarter -	2,050	Aug. 7	53	Jan. 14	108

Influence of the Nile.

There is a popular belief in Egypt that cholera never breaks out after the Nile has risen. If this means that it does not appear in any given town after the rise there, it is manifestly without foundation, but if it means that cholera does not explode after the Nile flood has reached the Delta, it is true. If we remember that every town in Egypt is supplied with drinking water, either from the Nile direct or from its canal branches, it is quite obvious that the rapid flow in great volume of the annual rise must very greatly affect the health of the inhabitants. It is probably the flood of August and the following months which drives cholera out of the country. An average Nile is at its lowest at Cairo about June 17th, and its rise is then so gradual as to be unimportant till the middle of July. In 1883 the river was very low until the rise began at Cairo on July 1st, and this rise would not reach Damietta in any perceptible form till at least July 10th. It would take another month before it could purify the water supply, and it was then that cholera ceased to ravage the town. Synchronous with the Nile flood is a healthful north wind, which blows up the river and must be of use in dispelling disease.

* Parkes' Hygiene, London, 1887, p. 9.

† Distance from Ismailieh Canal.

Table IV. shows that the Nile reached a very low level before its rise in five cholera years, and this, with its consequent effects on subsoil drainage, must certainly have had a very ill-predisposing effect.

Also it should be noticed that in 1855 as in 1883 the rise was late in coming, and the Delta would therefore have an extra fortnight of very bad drinking water. In 1865, on the other hand, the Nile was neither abnormally low nor late.

The arrival of the Nile flood is of course not sufficient to prevent an outbreak of cholera, for it may be noticed that in Upper Egypt, which gets its rise two weeks or more before Cairo, is affected by cholera some days after Cairo, but the presence of cleaner water in bulk may very likely modify the severity of the disease in the towns above Cairo.

TABLE IV.
REMARKS ON the NILE GAUGE at CAIRO.

Cholera Years.	Date of Rise.	Lowest Level before Rise.	Remarks.
		Cubits. Digits.	
		— —	
1831 - - -	} Not known.		
1834 - - -			
1837 - - -			
1840 - - -	- - -	5 8	Extremely low.
1848 - - -	- - -	7 16	Good.
1848 - - -	June 13 - -	5 14	Extremely low.
1849 - - -	June 21 - -	5 11	Extremely low.
1850 - - -	June 18 - -	5 11	Extremely low.
1855 - - -	July 1 - -	7 12	Good.
1865 - - -	June 7 - -	7 11	Good.
1866 - - -	June 27 - -	7 21	Good.
1883 - - -	July 1 - -	6 22	Rather low.

Cattle Plague.

Bovine typhus immediately preceded the cholera of 1883, and may have had something to do with the poisoning of the water supply, owing to the careless habits of the peasantry in thus disposing of carcasses, and also may have been one of the causes of the diarrhœa and vomiting which in some places anticipated the epidemic. The fellah, looking on meat food as a rare treat, was only too glad to eat the diseased cattle which had been slaughtered by veterinary order.

I thought it would be interesting to see whether cattle plague had any apparent connexion with previous cholera epidemics, but of this there is no proof.

The cattle plague was introduced into Egypt from Southern Russia in 1841, and raging till 1843, is calculated to have destroyed

665,000 head during the three years.* In 1863 there was another visitation, and it was reckoned that 734,642 cattle died, and were mostly thrown into the Nile,† but none of these were cholera years in Egypt. From what we know of native methods of stamping out disease, we may assume that it was still present in the country in 1865, but no writers on cholera have referred to it. In 1881 the plague was again introduced into Egypt by Russian cattle, and lasted till the serious epidemic of it in the first half of 1883. In April 1884 it was reported from Upper and Lower Egypt, and I found it myself in Cairo. We persuaded the Government to pass some urgent regulations, and prevented the import of all cattle from infected countries such as Russia and Syria. Since then the disease has been unknown in Egypt.

* Animal plagues, Fleming, London, 1882, p. 499.

† Typhoid fever was very prevalent in 1863 (Colucci Bey).



